HARDENED SUBMINIATURE TELEMETRY AND SENSOR SYSTEM

(HSTSS)

Briefing by:
Dennis Schneider
Project Director
407 384 3902
dennis_schneider@stricom.army.mil

Background

- HSTSS project was started in 1992 as an OSD Test Technology Development and Demonstration (TTD&D) and Army funded Project
- HSTSS is a multi service instrumentation development program
- HSTSS is a low cost, micro miniature, high g (100,000 g) modular instrumentation system
- The first component developed for HSTSS was the battery
- The transmitter and encoder developed for HSTSS have been tested

HSTSS Components

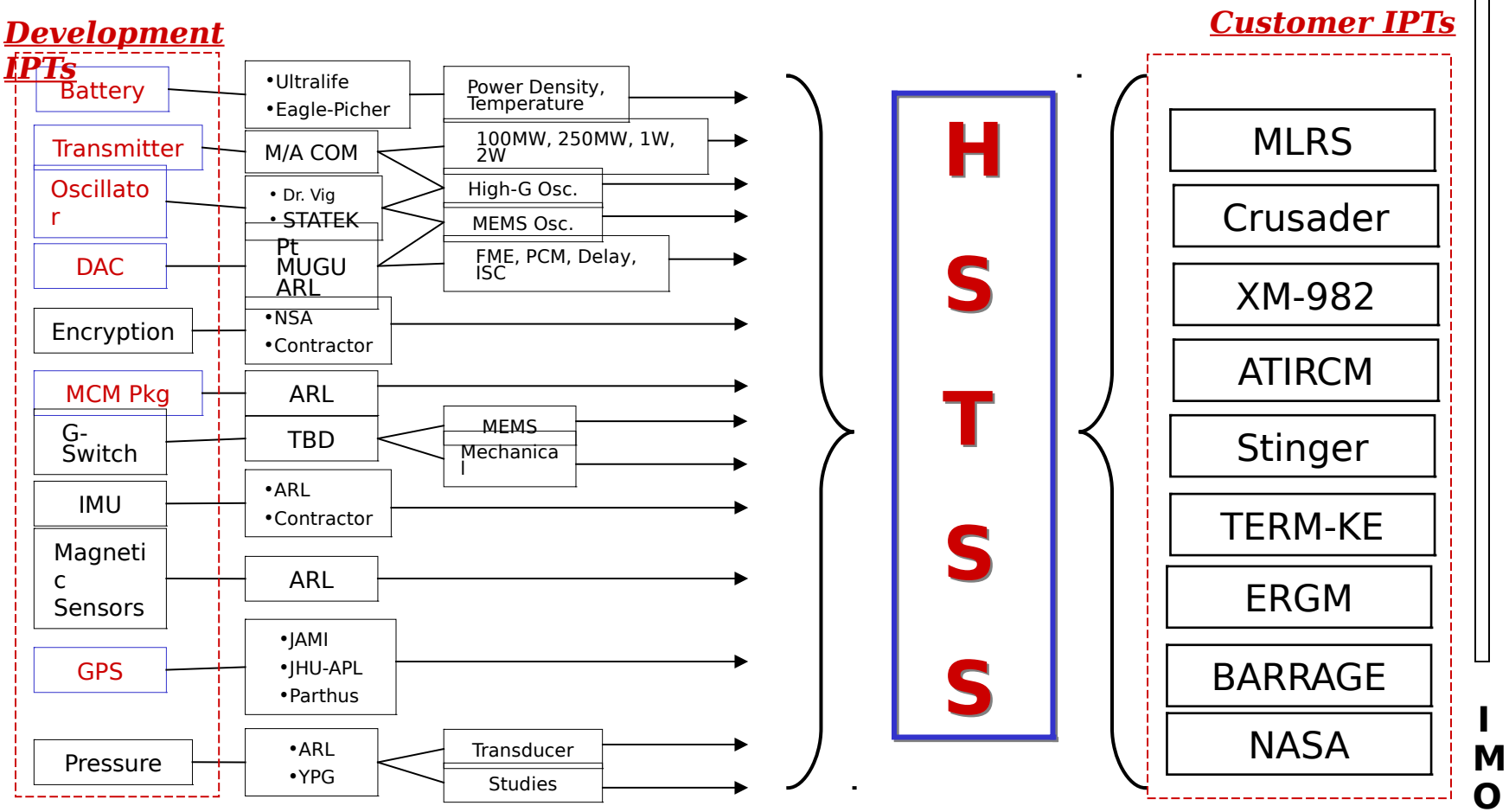
Development :

- Batteries
- Transmitters
- Data Acquisition Chipsets
- Crystal Oscillator

Studies:

- Packaging
- GPS
- Pressure Transducer

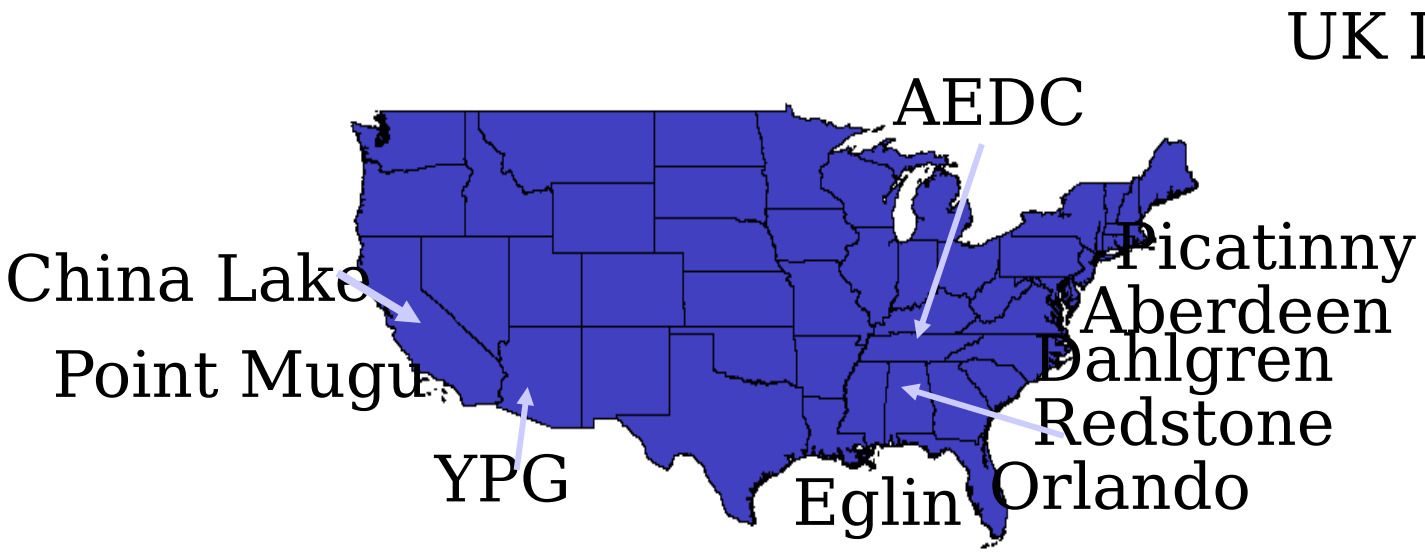
Hardened Subminiature Telemetry and Sensor System (HSTSS) (HSTSS)



Teamwork

- HSTSS has been successfully using Integrated Produ
- There are many WIPT which make HSTSS successful
- Everyone identified on the next chart is part of the HSTSS team

Government IPT Locations



PROGRAM TEAM

Project Director - Dennis Schneider

Engineer - John Kotleba (STRICOM)
David Lyon (ARL)
Dick McGee (ARL)
Gary Borgen (Pt Mugu)
Sal Longo (ARDEC)
Steve Davis (Eglin)
Shannon Haataja (RTTC)

Contract Specialist - Leslie Kennedy

Cost Analyst - Ivette Feliciano

Support Contractor - Robert Carpenter - (AST)
Ronald Colangelo (AEgis)
Alexandria Charles (AEgis)

System Contractors - M/A COM, Statek, Eagle Picher, JHU-APL, P
Ultralife, OETC

Acquisition/Contracting

- **Strategy**

Building block approach requiring multiple task orders using full and open competition

- **Rationale**

History has shown that not all expertise resides within a single company

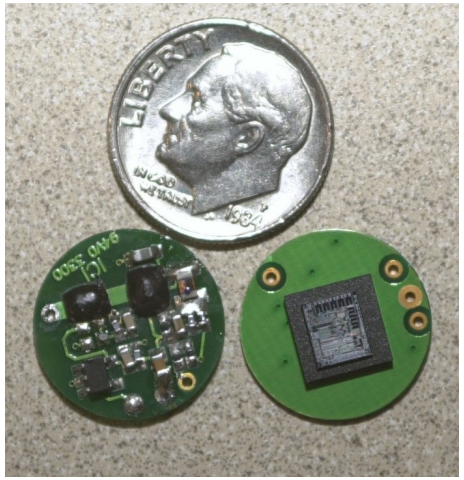
- **Issues**

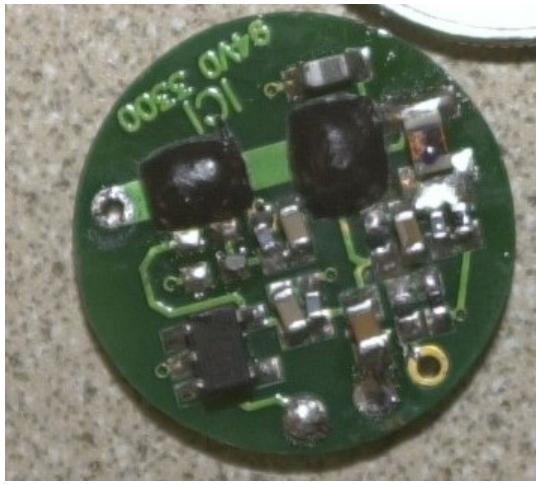
Looking for industry to partner with HSTSS for integration of modules and systems

Upcoming Events

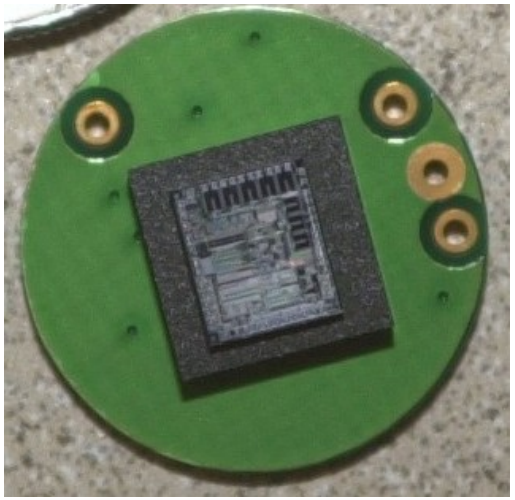
- HSTSS Symposium, August 21 - 23, Denver CO
- HSTSS.ORG for information
- Request for proposals via STOC Letters to Industry Partners

HSTSS Telemetry for Direct Fire

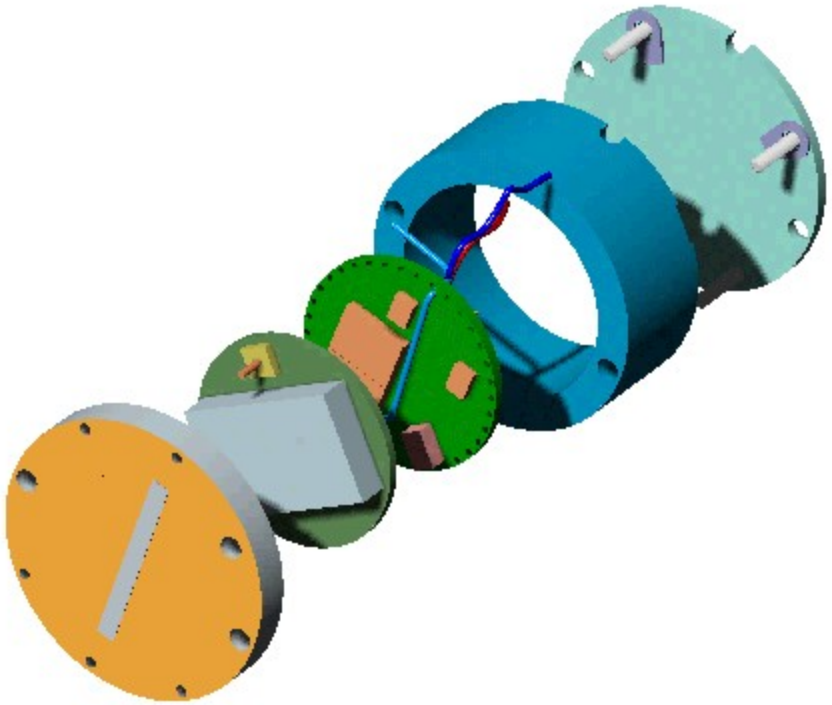




Transmitter

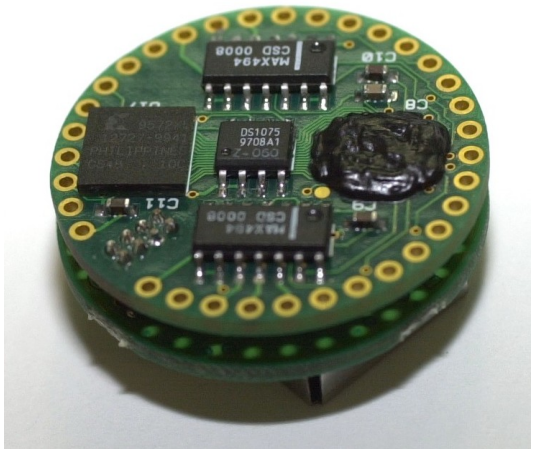


8 Ch A/D and CPLD

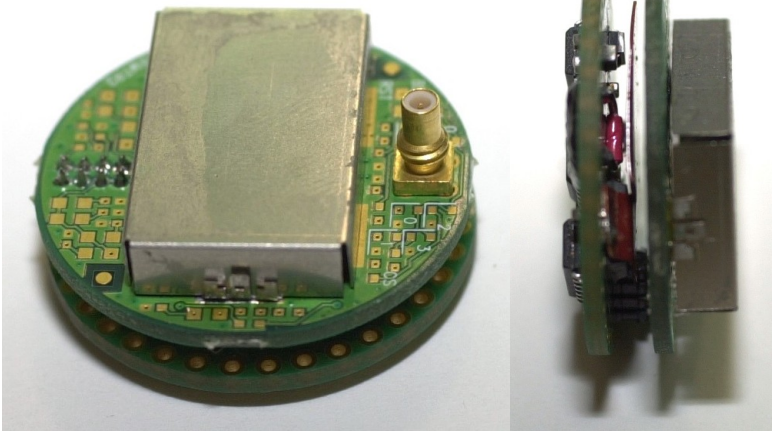


HSTSS Telemetry Module

ENCODER

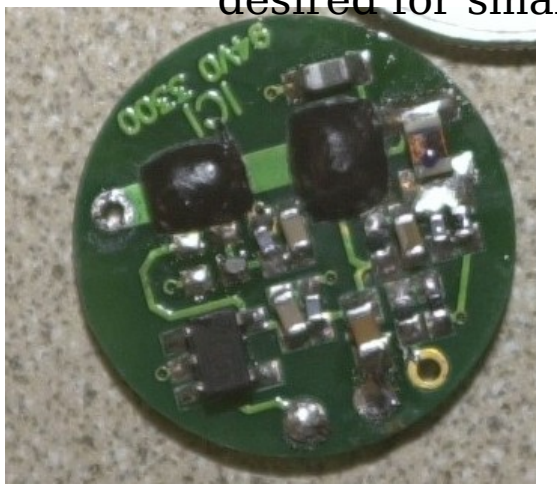


TRANSMITTER

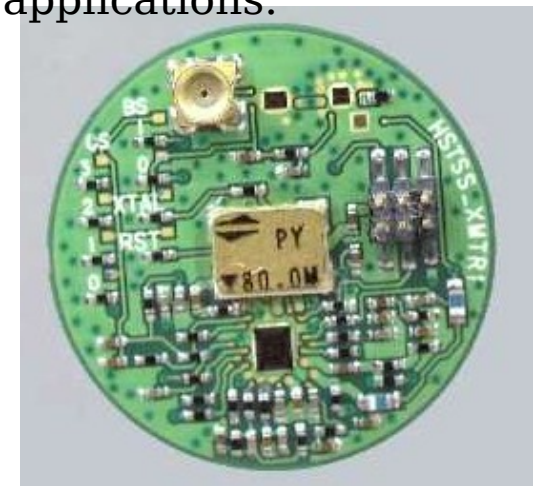


Potential Transmitter Requirements

Issue: Integrate High G S-Band Transmitter Modules. HSTSS has developed a set of transmitter chipsets (VCO, PLL, Amp, Crystal) and will be available after testing is complete. Expecting end of FY01. Below are two transmitter designs that HSTSS IPT is using. Larger designs are also desired for small missile applications.



15 mm Transmitter Board Design



28 mm Transmitter Board Design

Potential Transmitter Requirements

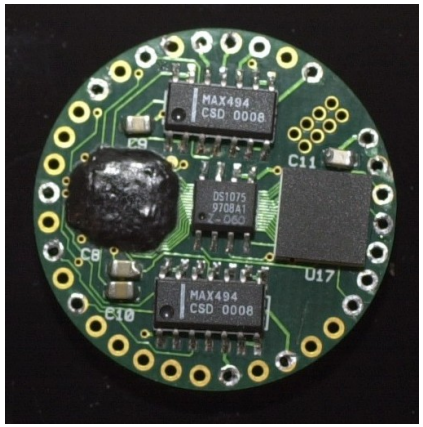
- Purchase MA/Com, Part Number A05935-16, PL S-Band 250 mW Transmitter Module.
  Several orders of 100 quantity in FY02, with potential
  for follow-on quantities

- Optimize MA/Com, Part Number A05935-16, (smaller
  form factor)

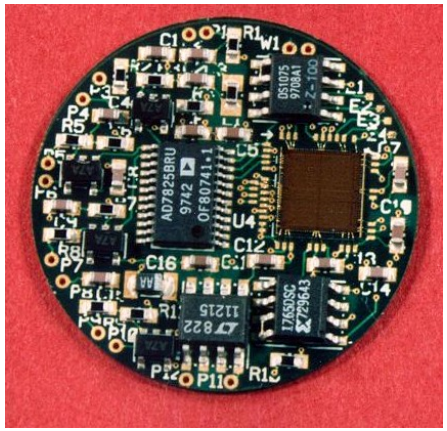
- Provide guidance on incorporation of new modulation
  scheme, currently used FM, FSK modulation. Looking
  for more efficient bandwidth.

Potential Encoder Requirements

Issue: Integrate High G Encoder Modules. HSTSS has developed encoder designs based on programmable logic devices (FPGA, CPLD, PIC) and have a need to take the designs and produce in quantities. Below are tw encoder designs that HSTSS IPT is using. Larger designs are also desired for small missile applications, such as a 2.75 Inch Missile.



28 mm CPLD PCM Encoder Design



28 mm FPGA PCM Encoder Design

Potential Encoder Requirements

- Purchase encoder from industry, can provide samples and characteri for stated design

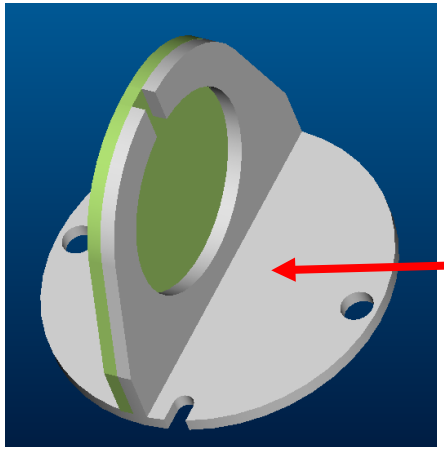
- Manufacture encoder design, form factor to be useable in NATO Standard Nose fuze and integration to MA/Com transmitter design

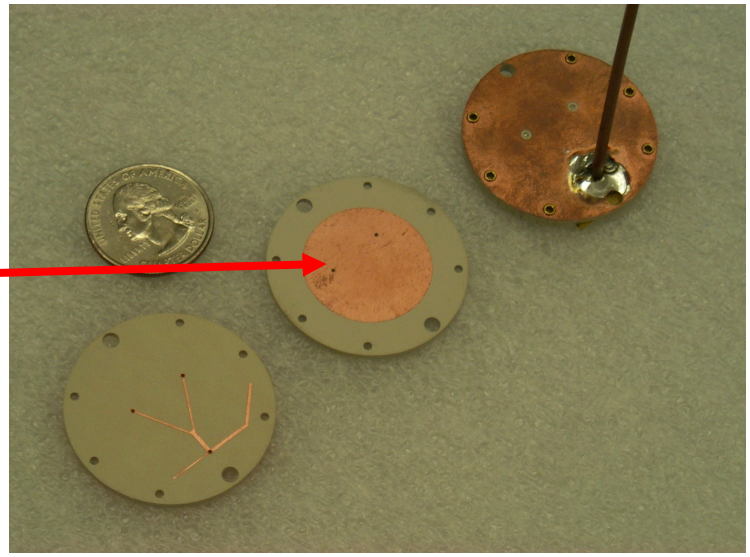
- Several orders of 100 quantity in FY02, with potential for follow-on quantities

Potential Antenna Requirements

Design Objective: Integrate a GPS Band Reject Filter into High G S-Band Antenna, Reduce Mechanical Profile, and Improve Front and Rear Antenna Gain.
NAWC-WD Antenna Footprint: 1.5 inch diameter by 0.1 inch height.

Current Design





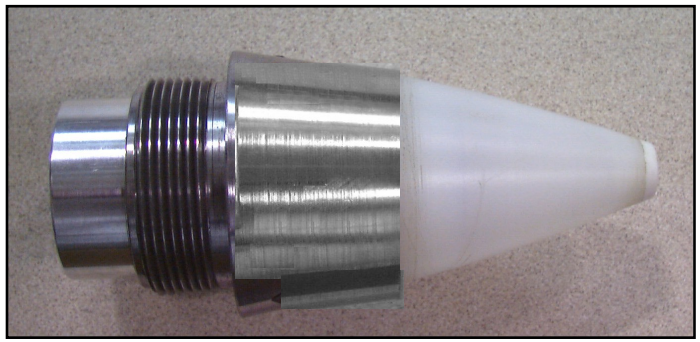
NAWC-PM TM Design

Potential Antenna Requirements

- Purchase antenna from industry, can provide samples and characte for stated design
- Manufacture antenna design, form factor to be useable in NATO Standard Nose fuze and integration to MA/Com transmitter design
- Several orders of 100 quantity in FY02, with potential for follow-on quantities

Potential Telemetry System Requirements

Issue: Integrate High G Telemetry Module. Currents designs have taken a larger design and optimized. The objective was to reduce the overall mechan profile.



Potential Telemetry System Requirements

- Purchase telemetry components from industry, can provide samples and characteristics for stated design
- Manufacture form factor to be useable in NATO Standard Nose fuze and integration to MA/Com transmitter design
- Several orders of 100 quantity in FY02, with potential for follow-on quantities

HSTSS Components

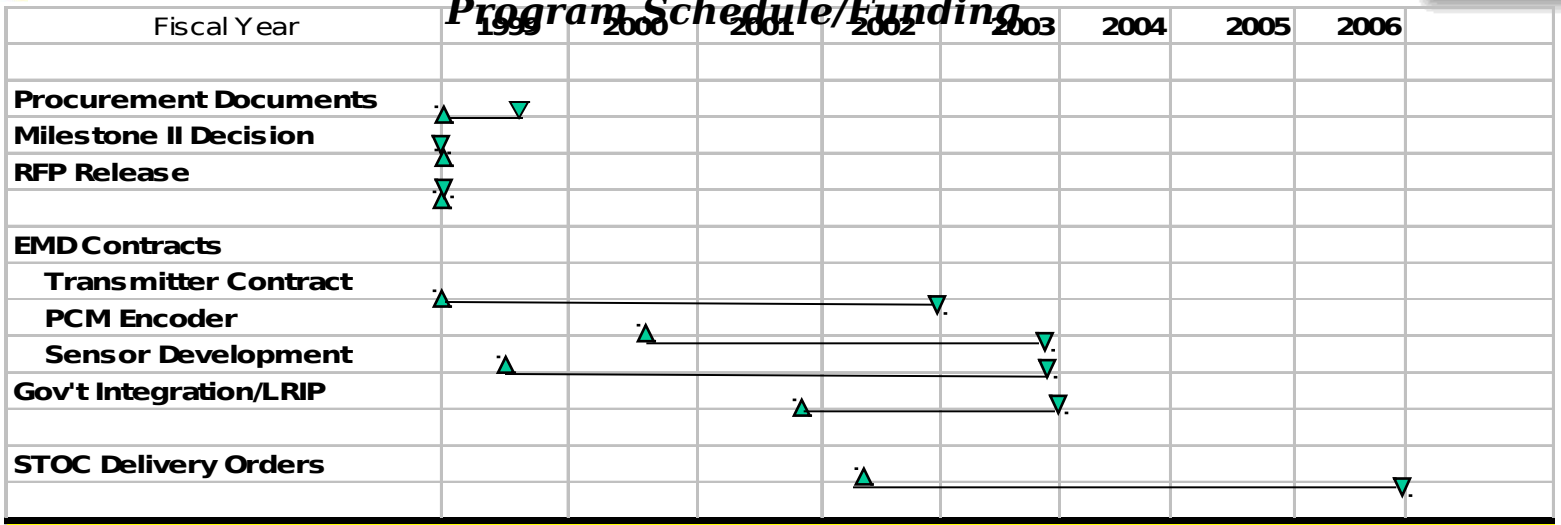
Transmitter	M-A/COM developed:. 100mW, 250mW, 1W, 2W power levels. (S & L Band IRIG std.)
Batteries	Ultralife, Eagle Pitcher, Primary & Rechargeable. Conformal packaging.
Data Acquisition	Pt. Mugu & ARL developed: PCM & sig. conditioning CPLD & FPGA technologies (MCM & PWB packaging
Sensors	TSPI, Pressure, Acceleration, etc.
Oscillator	STATEK developed: 100K g goal, 60K g demonstrated
Antennas	Leveraging MUBAT tri-service program/ Point Mugu Designers
Packaging	APL/ARL: developing rapid prototyping method for MCM technologies; high density pkg methodology

Critical Technical & Operational Parameters

- Building Block approach.
- The system is to be micro miniature and able to withstand up to 100,000 g's.
- Expandability and low cost instrumentation.
- Electrical and mechanical compatibility for embedd test instrumentation

Hardened Subminiature Telemetry and Sensor System (HSTSS)

Program Schedule/Funding



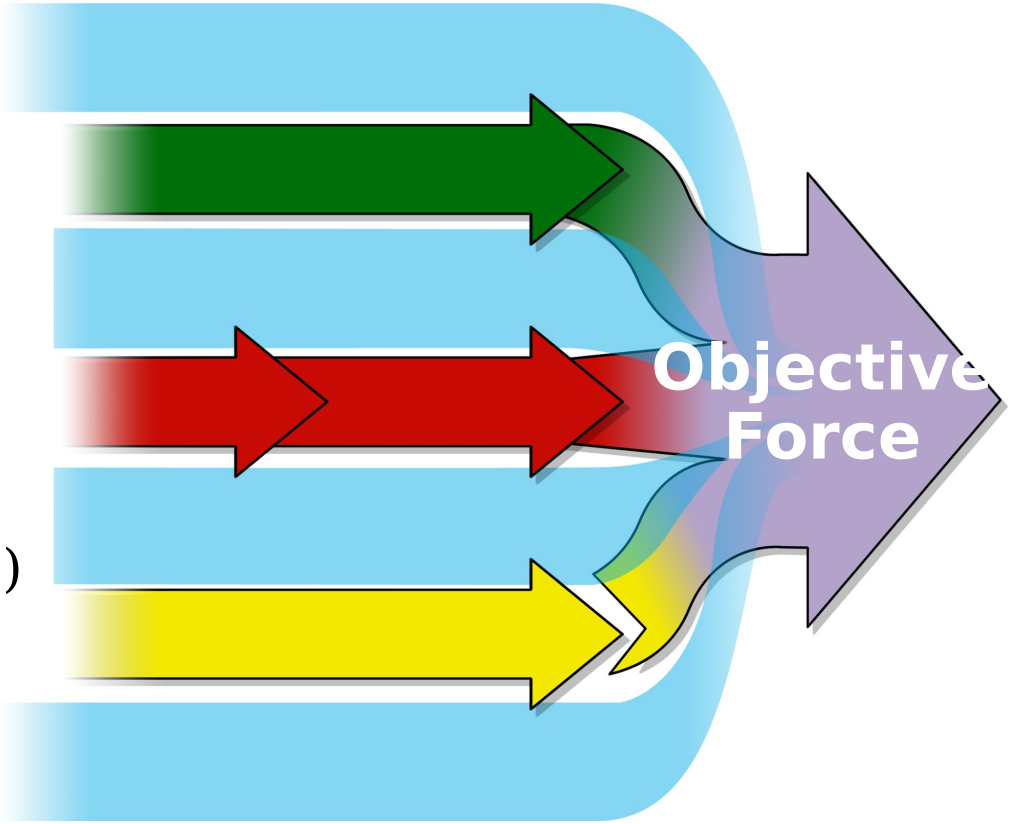
Dollars in Thousands	Prior	1999	2000	2001	2002	2003	2004	2005	2006
TOTAL Required					$	$			

IMO

PM-ITTS

Supports the Army Transformation

- Embedded Instrumentation (Test to Training)
- Support To FCS (Small Caliber to EM)



Summary

- HSTSS anticipating 2 to 4 Delivery Orders via STOC in FY02

- HSTSS meets the instrumentation needs which could not be met before

- HSTSS is successful because we used the IPT and Partnering to guide program management

- HSTSS Symposium, August 21 -23, 2001, Denver CO